

**REMARKS****INTRODUCTION:**

In accordance with the foregoing, claims 1, 3 and 9 have been amended, and new claims 11-13 have been added. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1-13 are pending and under consideration. Reconsideration is respectfully requested.

**CHANGES TO THE SPECIFICATION:**

A. In the Office Action, at page 2, numbered paragraph 1, the disclosure was objected to because of informalities.

The specification has been reviewed in response to this Office Action. Changes have been made to the specification only to place it in preferred and better U.S. form for issuance and to resolve the Examiner's objections raised in the Office Action. That is, the spelling of "melamin" in paragraph 30 on page 8 has been corrected to recite ---melamine--- and the term "Araldite" has been corrected to recite ---ARALDITE--- in paragraph 77 of page 23. No new matter has been added.

B. In the Office Action, at pages 2-3, numbered paragraph 2, the specification was objected to as failing to provide proper antecedent basis for the claimed subject matter.

The Examiner objected to the terminology of claim 8, which recites:

"8. The multi-layered organic electrophotographic photoconductor of claim 7, wherein the phthalocyanine compounds comprise a benzene ring having a substituent that is selected from the group consisting of a halogen and an alkyl group."

The Examiner noted that paragraph 31 recites "A benzene ring(s) in the structural formula of the phthalocyanine compounds may have a substituent, for example, a halogen atom or **an occasionally substituted** alkyl group" (emphasis added), interpreting same to refer **only** to a substituted alkyl group. However, it is respectfully submitted that, as is known to those skilled in the art, the terminology "may have a substituent, for example, a halogen atom or **an occasionally substituted** alkyl group" (emphasis added) clearly states that the alkyl group **occasionally** is substituted, i.e., **may be** an alkyl group (**unsubstituted**) or a **substituted** alkyl group. Hence, applicant respectfully submits that the terminology "a benzene ring having a substituent that is selected from the group consisting of a halogen and an alkyl group" is clear and is supported by paragraph 31 of the specification.

C. In the Office Action, at page 3, numbered paragraph 3, the Examiner noted that the recitation "overlapping range in molecular weight distributions" in claim 1 is defined in the instant specification in paragraphs 0037-0040, when the conditions (1) or (2), as described in paragraphs 0039 and 0040, respectively, are satisfied.

As noted by the Examiner, paragraphs 0037-0040 recite:

[0037] Here, two molecular weight distributions are defined to be 'overlapping' in an embodiment of the present invention, if the following condition (1) or (2) is satisfied.

[0038] Two distribution curves representing the two molecular weight distributions are normalized by converting the maximum detection intensity of each distribution to unity. 'A half-width region' for each distribution curve is defined by a region that is enclosed by the distribution curve; the half-width region has a width equal to a half-width of the distribution curve; and the center of the 'half-width region' is disposed at the peak position of the distribution curve.

[0039] Condition (1): Either a half-width region of one distribution curve overlaps with a tail portion of the other distribution curve, and the overlapped region has a finite area, or both of half-width regions overlap with a tail portion of the other distribution curve, and the overlapped region has a finite area.

[0040] Condition (2): The two normalized distribution curves have an intersection and the height of the intersection is not smaller than  $1/e$ , where  $e$  is the base of the natural logarithm.

Thus, said conditions for when two molecular weight distributions are defined to be 'overlapping' are believed to be clear.

#### **REJECTION UNDER 35 U.S.C. §112:**

In the Office Action, at pages 3-4, numbered paragraph 5, claims 3 and 4 were rejected under 35 U.S.C. §112, second paragraph, for the reasons set forth therein. This rejection is traversed and reconsideration is requested.

It is respectfully submitted that the terminology "a mixture of two or more types of the poly(vinyl acetal) that have different weight average molecular weights..." clearly refers to poly(vinyl acetal) resins having different weight average molecular weights, as noted in paragraph 36, which recites: "A preferable mixture for enhancing the adhesion ability is obtained by mixing low molecular weight poly(vinyl acetal) having a polystyrene-converted weight average molecular weight of  $1.0 \times 10^4$  to  $7.0 \times 10^4$  with medium to high molecular weight poly(vinyl acetal) having a polystyrene-converted weight average molecular weight of  $8 \times 10^4$  to  $1.8 \times 10^5$ . Each resin of such a mixture has a molecular weight distribution before mixing that has an overlapping range. ... In an embodiment of the present invention, the binder resin used in the charge generation layer is preferably a mixture of two or more types of resins that have

different weight average molecular weights and have an overlapping range in their molecular weight distributions.”(emphasis added). However, for clarity, claim 3 has been amended to recite:

3. (currently amended) A multi-layered organic electrophotographic photoconductor comprising:

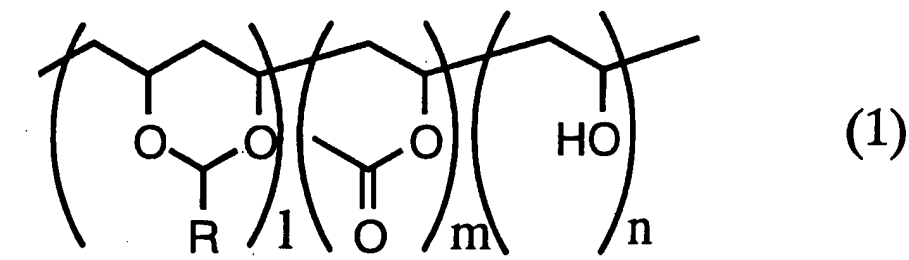
a conductive substrate and layers including an undercoat layer containing a thermosetting resin,

a charge generation layer containing charge generation material and organic binder resin, and

a charge transport layer laminated sequentially on the substrate,

wherein polydispersity defined by a ratio of a weight average molecular weight to a number average molecular weight of the organic binder resin is at least 4.0, and the weight average molecular weight is at least  $7.0 \times 10^4$  in a distribution of a polystyrene-converted molecular weight obtained by gel permeation chromatography,

wherein the binder resin of the charge generation layer is substantially composed of poly(vinyl acetal) represented by the following chemical formula (1),



where l, m, and n are integers, and R is an alkyl group of one or more carbons or a hydrogen atom, and

~~An electrophotographic photoconductor according to claim 2,~~ wherein the binder resin of the charge generation layer is substantially composed of a mixture of two or more ~~types of the poly(vinyl acetal) resins~~ that have different weight average molecular weights and have an overlapping range in molecular weight distributions.

Thus, amended claim 3 is submitted to be clear under 35 U.S.C. §112, second paragraph. Since claim 4 depends from amended claim 3, claim 4 is submitted to be clear under 35 U.S.C. §112, second paragraph for at least the reasons that amended claim 3 is submitted to be clear under 35 U.S.C. §112, second paragraph.

#### REJECTION UNDER 35 U.S.C. §102:

In the Office Action, at pages 4-7, numbered paragraph 7, claims 1, 2, and 5-7 were

rejected under 35 U.S.C. §102(b) as being unpatentable over Japanese Patent 2002-107972 (JP '972) combined with USPN 4,518,669 (Yashiki). This rejection is traversed and reconsideration is requested.

First, it should be noted that, for claims to be anticipated under 35 U.S.C. §102, the courts have held that a single prior art reference must disclose each and every limitation of the claimed invention. Lewmar Marine, Inc. v. Barient, Inc., 827 F.2d 744, 747 (Fed. Cir. 1987). Here, the Examiner attempts to combine two patents to show anticipation, which is not allowable. Thus, claims 1, 2, and 5-7 cannot be anticipated under 35 U.S.C. §102(b) over Japanese Patent 2002-107972 (JP '972) combined with USPN 4,518,669 (Yashiki).

It is respectfully submitted that JP '972 discloses an aluminum base/a conductive layer formed of  $\text{TiO}_2$  and a thermoset resin/polyamide undercoat layer/charge generating layer ( $\text{GaPc}(\text{OH})_2$ ) and a polyvinyl-butyral-resin/charge transportation layer in Example 1.

A polyamide undercoat layer (UCL) formed on a conductor layer in JP '972 is different from a UCL of the present invention because a polyamide UCL is not a thermoset resin. In the present invention, polyvinyl-butyral resin, which has a specific molecular weight distribution, is used to improve adhesion between a CGL (charge generating layer) and a UCL of the invention. Therefore, this invention is different from the invention disclosed in JP '972, which does not use a thermoset resin for a UCL.

A conductor layer must be distinguished from a UCL in JP '972 because both layers have different functions in JP '972. The Examiner should therefore now recognize that these two layers are different from the layers of the present invention, which comprise a multi-layered organic electrophotographic photoconductor of a function separated type.

It is respectfully submitted that the inventor of the present invention estimates from the prior art that a purpose of a conductor layer is coating defects on the surface of, for example, an aluminum base, and a purpose of a UCL is preventing hole injection from a conductor layer.

Yashiki discloses that thermoset resin is used for a UCL and that a UCL is placed between a conductive base and a sensitization layer to improve adhesion between the conductive base and the sensitization layer. However, Yashiki does not disclose adhesion between a CGL and a UCL, as is recited in the present invention.

Advantages of the present invention include improvement of adhesion between a CGL and a UCL by using a thermoset resin for a UCL and prescribed electrical characteristics. Such advantages were not achieved until the present invention.

The combination of JP '972 and Yashiki does not suggest that polyvinyl-butyral-resin, which has a specific molecular weight distribution, is used for an adhesion-resin of a CGL and

that improvement of adhesion between a CGL and a UCL is achieved. Therefore, the combination of JP '972 and Yashiki does not teach or suggest the present invention to one skilled in the art.

As noted by the Examiner, JP '972 does not disclose that its intermediate layer comprises a thermosetting resin, as is recited in the present claimed invention. Hence, JP '972 does not teach or suggest claim 1 of the present invention.

Although Yashiki discloses an intermediate layer between an aluminum conductive substrate and a charge generation layer, **Yashiki requires that the intermediate layer be covered with a non-conductive resin layer**, col. 4, lines 27-30: "Accordingly, the coat containing the surface-treated titanium oxide dispersed **is required to be covered with a resin layer not containing conductive powder**"(emphasis added). In contrast, the present claimed invention implements an undercoat layer that may include titanium oxide whose function is scattering exposed light and **transporting photo-generated charges** to the (conductive) substrate. See paragraph 30 of the specification. Hence, it is respectfully submitted that Yashiki teaches away from the present invention.

Thus, claim 1 is patentable under 35 U.S.C. §102(b) over Japanese Patent 2002-107972 (JP '972) alone or in combination with USPN 4,518,669 (Yashiki). Since claims 2 and 5-7 depend from claim 1, claims 2 and 5-7 are patentable under 35 U.S.C. §102(b) over Japanese Patent 2002-107972 (JP '972) alone or in combination with USPN 4,518,669 (Yashiki) for at least the reasons that claim 1 is patentable under 35 U.S.C. §102(b) over Japanese Patent 2002-107972 (JP '972) alone or in combination with USPN 4,518,669 (Yashiki).

#### **REJECTION UNDER 35 U.S.C. §103:**

**A.** In the Office Action, at pages 8-11, numbered paragraph 8, claims 1, 5, 7, and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over USPN 5,066,557 (Robinette) combined with USPN 5,677,096 (Suzuki). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

The Examiner notes that Robinette does not exemplify a photoconductor comprising an undercoat layer (Office Action, page 9, third paragraph), as is recited in independent claim 1 of the present claimed invention. In fact, the Examiner notes that Robinette teaches that any suitable charge blocking layer may be interposed between the conductive layer and the charge generation layer. An underlayer in the present invention has a function of preventing hole injection from a conductor layer to a sensitization layer, i.e., a function of a blocking layer for a hole and a function of transporting mainly only electrons in a photo-generated charge to a

conductor layer. A blocking layer of Robinette and an undercoat layer of the present invention have similar electrical characteristics because Robinette recites that an undercoat layer is used as a blocking layer for a hole.

Robinette makes no distinction between a hole and an electron, and Robinette recites only a charge blocking layer. The Japanese application (JP 3-225346) corresponding to Robinette recites a "hole blocking layer" as a charge blocking layer.

Hence, Robinette does not teach or suggest claim 1 of the present claimed invention.

Claim 1 has been amended to show more clearly that poly(vinyl acetal) is utilized as the organic binder resin. Suzuki fails to teach or suggest using poly(vinyl acetal) as the organic binder resin. Hence, Suzuki does not teach or suggest claim 1 of the present claimed invention.

Thus, amended claim 1 is submitted to be patentable under 35 U.S.C. §103(a) over USPN 5,066,557 (Robinette) and/or USPN 5,677,096 (Suzuki), alone or in combination. Since claims 2, 5, 7 and 10 depend from amended claim 1, claims 2, 5, 7 and 10 are submitted to be patentable under 35 U.S.C. §103(a) over USPN 5,066,557 (Robinette) alone or in combination with USPN 5,677,096 (Suzuki) for at least the reasons that amended claim 1 is submitted to be patentable under 35 U.S.C. §103(a) over USPN 5,066,557 (Robinette) alone or in combination with USPN 5,677,096 (Suzuki).

**B.** In the Office Action, at pages 11-13, numbered paragraph 9, claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over USPN 5,066,557 (Robinette) combined with USPN 5,677,096 (Suzuki), "as evidenced by applicant's admission that titanium oxide can be used as the fine particles that perform the functions of scattering exposed light and transporting photo-generated charges to the substrate disclosed in paragraph 0030 of the instant specification, as applied to claim 7 above, further combined with USPN 5,759,726 (Tambo). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

As noted above, amended claim 1 is submitted to be patentable under 35 U.S.C. §103(a) over USPN 5,066,557 (Robinette) and/or USPN 5,677,096 (Suzuki), alone or in combination.

It is respectfully submitted that Tambo fails to teach or suggest a multi-layered organic electrophotographic photoconductor comprising: a conductive substrate and layers including an undercoat layer containing a thermosetting resin, a charge generation layer containing charge generation material and organic binder resin, and a charge transport layer laminated sequentially on the substrate, wherein polydispersity defined by a ratio of a weight average molecular weight to a number average molecular weight of the organic binder resin is at least

4.0, and the weight average molecular weight of poly(vinyl acetal) utilized in the organic binder resin is at least  $7.0 \times 10^4$  in a distribution of a polystyrene-converted molecular weight obtained by gel permeation chromatography, as is recited by amended claim 1 of the present invention.

In Tambo, the underlayer interposed between an electron charge generating layer and a base plate refers to a Japanese basic application (JP application No. 8-158183, i.e., JP laid-open patent application No. 9-258466) corresponding to Tambo and FIG. 5 in Tambo, which is clearly different from the layers of the present invention (see FIG. 1 of the present invention), wherein current layered organic electrophotographic photoconductors generally have a substrate layer as a support layer and two active layers, which generally include (1) a charge generation layer containing a light absorbing material, and (2) a charge transport layer containing electron donor molecules, may be arranged in any order, and sometimes can be combined in a single or a mixed layer. In an embodiment of the present invention, an undercoat layer, a charge generation layer, and a charge transport layer may be sequentially formed on a conductive substrate in the order recited. The photosensitive layer includes a combination of the charge generation layer and the charge transport layer.

Thus, amended 1 is submitted to be patentable under 35 U.S.C. §103(a) over USPN 5,066,557 (Robinette), USPN 5,677,096 (Suzuki), and/or USPN 5,759,726 (Tambo), alone or in combination.

Since claim 8 depends from amended claim 1, claim 8 is submitted to be patentable under 35 U.S.C. §103(a) over USPN 5,066,557 (Robinette), USPN 5,677,096 (Suzuki), and/or USPN 5,759,726 (Tambo), alone or in combination, for at least the reasons that amended claim 1 is submitted to be patentable under 35 U.S.C. §103(a) over USPN 5,066,557 (Robinette), USPN 5,677,096 (Suzuki), and/or USPN 5,759,726 (Tambo), alone or in combination.

#### **CLAIMS OBJECTED TO:**

**A.** Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 9 has been rewritten in independent form including all of the limitations of the base claim and any intervening claims, with a slight change. Thus, claim 9 is submitted to be in allowable form.

**B.** Claims 3 and 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. §112, second paragraph, and to include all of the limitations of the base claim and any intervening claims.

Claim 3 has been rewritten to overcome the rejection(s) under 35 U.S.C. §112, second

paragraph, and to include all of the limitations of the base claim and any intervening claims. Thus, claim 3 is submitted to be in allowable form. Since claim 4 depends from amended claim 3, claim 4 is submitted to be allowable for at least the reasons that claim 3 is submitted to be allowable.

**CONCLUSION:**

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot, and further, that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any underpayments or overpayments of fees associated with the filing of this Amendment, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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